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For: *BIOLOGICAL SYSTEMS FOR MANUFACTURE OF
POLYHYDROXYALKANOATE POLYMERS CONTAINING 4-HYDROXYACIDS*

Commissioner for Patents
P.O. Box 1450
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INFORMATION DISCLOSURE STATEMENT

Sir:

Pursuant to 37 C.F.R. §1.56 and 37 C.F.R. §1.97, Applicants submit an Information Disclosure Statement, including fifteen (15) pages of Form PTO-1449. All of the documents cited below were cited by or submitted to the Patent Office in Application Serial No. 10/006,915 filed November 9, 2001, to which the present application claims priority. Pursuant to 37 C.F.R. §1.98(d), Applicants are not enclosing copies of these publications. Copies will be provided upon request, however.

This Information Disclosure Statement is being filed under 37 C.F.R. § 1.97(b) prior to a first Office Action on the merits. It is believed that no fee is required with this submission. However, should a fee be required, the Commissioner is hereby authorized to charge any required fees to Deposit Account No. 50-1868.

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Remarks

This statement should not be interpreted as a representation that an exhaustive search has been conducted or that no better art exists. Moreover, Applicants invite the Examiner to make an independent evaluation of the cited art to determine its relevance to the subject matter of the present application. Applicants are of the opinion that their claims patentably distinguish over the art referred to herein, either alone or in combination.

Respectfully submitted,

A handwritten signature in dark ink, appearing to be 'Patrea L. Pabst', written over a horizontal line.

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				Applicati n Numb r		Continuati n f 10/006,915	
				Filing Date		February 6, 2004	
				First Named Inventor		Gjalt W. Huisman	
				Group Art Unit			
				Examiner Name			
Sheet	1	of	15	Attorney Docket Number	MBX 017 CON (2)		

U.S. PATENT DOCUMENTS						
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		Number	Kind Code ² (if known)			
		4,430,430		Momose, et al.	02-07-1989	
		4,876,331		Doi	10-24-1989	
		5,245,023		Peoples, et al.	09-14-1993	
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		5,286,842		Kimura	02-15-1994	
		5,292,860		Shiotani et al	03-08-1994	
		5,378,616		Tujimoto, et al.	01-03-1995	
		5,461,139		Gonda, et al.	10-24-1995	
		5,502,273		Bright, et al.	03-26-1996	
		5,516,883		Hori, et al.	05-14-1996	
		5,534,432		Peoples, et al.	07-09-1996	
		5,563,239		Hubbs, et al.	10-08-1996	
		5,602,321		John	02-11-1997	
		5,610,041		Somerville, et al.	03-11-1997	
		5,650,555		Somerville, et al.	07-22-1997	

FOREIGN PATENT DOCUMENTS								
Examiner Initials [*]	Cite No. ¹	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
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		Filing Date	February 6, 2004
		First Named Inventor	Gjalt W. Huisman
		Group Art Unit	
		Examiner Name	
Sheet 3 of 15	Attorney Docket Number	MBX 017 CON (2)	

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		ABE, et al., "Biosynthesis from gluconate of a random copolyester consisting of 3-hydroxybutyrate and medium-chain-length 3-hydroxyalkanoates by <i>Pseudomonas</i> sp. 61-3," <i>Int. J. Biol. Macromol.</i> 16:115-119 (1994).	
		AIDOO, et al., "Cloning, sequencing and disruption of a gene from <i>Streptomyces clavuligerus</i> involved in clavulanic acid biosynthesis," <i>Gene</i> 147:41 (1994).	
		ALLEN, et al., "DNA sequence of the putA gene from <i>Salmonella typhimurium</i> : a bifunctional membrane-associated dehydrogenase that binds DNA," <i>Nucleic Acids Res.</i> 21:1676 (1993).	
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		BAUM, et al., "A plant glutamate decarboxylase containing a calmodulin binding domain. Cloning, sequence, and functional analysis," <i>J. Biol. Chem.</i> 268:19610-19617 (1993).	
		BELL AND MALMBERG, "Analysis of a cDNA encoding arginine decarboxylase from oat reveals similarity to the <i>Escherichia coli</i> arginine decarboxylase and evidence of protein processing," <i>Mol. Gen. Genet.</i> 224:431 (1990).	

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		Filing Date	February 6, 2004
		First Named Inventor	Gjalt W. Huisman
		Group Art Unit	
		Examiner Name	
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		BENACHENHOU-LAHFA, et al., "PCR-mediated cloning and sequencing of the gene encoding glutamate dehydrogenase from the archaeon <i>Sulfolobus shibatae</i> : identification of putative amino-acid signatures for extremophilic adaptation," <i>Gene</i> 140: 17-24 (1994).	
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		CHANG, et al., "Nucleotide Sequence of cDNA (Accession No. U63832) Encoding Arginine Decarboxylase from Carnation Flowers," <i>Plant Physiol.</i> 112:863 (1996).	
		CHAVEZ, et al., "The NADP-glutamate dehydrogenase of the cyanobacterium <i>Synechocystis</i> 6803: cloning, transcriptional analysis and disruption of the <i>gdhA</i> gene," <i>Plant Mol. Biol.</i> 28:173-188 (1995).	
		CHEN & MALOY, "Regulation of proline utilization in enteric bacteria: cloning and characterization of the <i>Klebsiella put</i> control region," <i>J. Bacteriol.</i> 173:783 (1991).	
		CHO, et al., "Identification of <i>Agrobacterium tumefaciens</i> genes that direct the complete catabolism of octopine," <i>J. Bacteriol.</i> 178:1872 (1996).	

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		First Named Inventor	Gjalt W. Hulsman		
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		CHU, et al., "Enzymatically active truncated cat brain glutamate decarboxylase: expression, purification, and absorption spectrum," <i>Arch. Biochem. Biophys.</i> 313:287-295 (1994).	
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		DESMET, et al., "Characterization of intracellular inclusions formed by <i>Pseudomonas oleovorans</i> during growth on octane," <i>J. Bacteriol.</i> 154:870-878 (1983).	
		DIRUGGIERO, et al., "Expression and in vitro assembly of recombinant glutamate dehydrogenase from the hyperthermophilic archaeon <i>Pyrococcus furiosus</i> ," <i>Appl. Environ. Microbiol.</i> 61:159-164 (1995).	
		DOI, "Microbial Synthesis, Physical Properties, and Biodegradability of Polyhydroxyalkanoates," <i>Macromol. Symp.</i> 98:585-599 (1995).	
		DOI, et al., "Biosynthesis and characterization of poly(3-hydroxybutyrate-co-4-hydroxybutyrate) in <i>Alcaligenes eutrophus</i> ," <i>Int. J. Biol. Macromol.</i> 12: 106 (1990).	

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		Filing Date	February 6, 2004
		First Named Inventor	Gjalt W. Huisman
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		Examiner Name	
Sheet 6 of 15	Attorney Docket Number	MBX 017 CON (2)	

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		DOI, et al., "Nuclear Magnetic Resonance Studies on Unusual Bacterial Copolyesters of 3-Hydroxybutyrate and 4-Hydroxybutyrate," <i>Macromolecules</i> 21:2722-2727 (1988).	
		DUNCAN, et al., "Purification and properties of NADP-dependent glutamate dehydrogenase from <i>Ruminococcus flavefaciens</i> FD-1," <i>Appl. Environ. Microbiol.</i> 58:4032-4037 (1992).	
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		GALLOWAY, et al., "Phylogenetic utility of the nuclear gene arginine decarboxylase: an example from Brassicaceae," <i>Mol Biol Evol.</i> 15(10):1312-20 (1998).	
		GASSER & FRALEY, "Genetically Engineering Plants for Crop Improvement," <i>Science</i> 244:1293-1299 (1989).	
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		GERNGROSS, et al., "Overexpression and purification of the soluble polyhydroxyalkanoate synthase from <i>Alcaligenes eutrophus</i> : evidence for a required posttranslational modification for catalytic activity," <i>Biochemistry</i> 33: 9311 (1994).	

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		GONZALEZ, et al., "Cloning of a yeast gene coding for the glutamate synthase small subunit (GUS2) by complementation of <i>Saccharomyces cerevisiae</i> and <i>Escherichia coli</i> glutamate auxotrophs," <i>Mol. Microbiol.</i> 6:301-308 (1992).	
		GREGERSON, et al., "Molecular characterization of NADH-dependent glutamate synthase from alfalfa nodules," <i>Plant Cell</i> 5:215 (1993).	
		HEIN, et al., "Biosynthesis of poly(4-hydroxybutyric acid) by recombinant strains of <i>Escherichia coli</i> ," <i>FEMS Microbiol. Lett.</i> 153:411-418 (1997).	
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		JIMENEZ-ZURDO, et al., "The <i>Rhizobium meliloti</i> putA gene: its role in the establishment of the symbiotic interaction with alfalfa," <i>Mol. Microbiol.</i> 23:85 (1997)	
		JOHNSTON, et al., "Complete nucleotide sequence of <i>Saccharomyces cerevisiae</i> chromosome VIII," <i>Science</i> 265:2077 (1994).	
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		KATO, et al., "Open reading frame 3 of the barotolerant bacterium strain DSS12 is complementary with <i>cydD</i> in <i>Escherichia coli</i> : <i>cydD</i> functions are required for cell stability at high pressure," <i>J. Biochem.</i> 120:301 (1996).	

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		Application Number	Continuation of 10/006,915
		Filing Date	February 6, 2004
		First Named Inventor	Gjalt W. Huisman
		Group Art Unit	
		Examiner Name	
Sheet 9 of 15	Attorney Docket Number	MBX 017 CON (2)	

OTHER ART -- NON PATENT LITERATURE DOCUMENTS			
Examiner's Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ²
		LEE, et al., "Enhanced biosynthesis of P(3HB-3HV) and P(3HB-4HB) by amplification of the cloned PHB biosynthesis genes in <i>Alcaligenes eutrophus</i> ," <i>Biotechnol. Lett.</i> 19: 771-774 (1997).	
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		MILLER, et al., "Cloning and characterization of <i>gdhA</i> , the structural gene for glutamate dehydrogenase of <i>Salmonella typhimurium</i> ," <i>J. Bacteriol.</i> 157:171-178 (1984).	
		MIYAMOTO, et al., "Possible physiological roles of aspartase, NAD- and NADP-requiring glutamate dehydrogenases of <i>Pseudomonas fluorescens</i> ," <i>J. Biochem.</i> 112:52-56 (1992).	
		MOORE & BOYLE, "Nucleotide sequence and analysis of the <i>speA</i> gene encoding biosynthetic arginine decarboxylase in <i>Escherichia coli</i> ," <i>J. Bacteriol.</i> 172:4631 (1990).	
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		NAKAMURA, et al., "Cloning and sequencing of novel genes from <i>Vibrio alginolyticus</i> that support the growth of K ⁺ uptake-deficient mutant of <i>Escherichia coli</i> ," <i>Biochim. Biophys. Acta</i> 1277:201 (1996).	
		NAM, et al., "Differential expression of ADC mRNA during development and upon acid stress in soybean (<i>Glycine max</i>) hypocotyls," <i>Plant Cell Physiol.</i> 38:1156 (1997).	
		OLIVER, et al., "Determination of the nucleotide sequence for the glutamate synthase structural genes of <i>Escherichia coli</i> K-12," <i>Gene</i> 60:1 (1987).	
		OWEN & PEN, eds., <i>Transgenic Plants: A Production System for Industrial and Pharmaceutical Proteins</i> John Wiley & Sons Ltd: England, 1996.	

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				Gjalt W. Huisman	
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		PARK, et al., "Isolation and characterization of recombinant mitochondrial 4-aminobutyrate aminotransferase," <i>J. Biol. Chem.</i> 268: 7636-7639 (1993).	
		PELANDA, et al., "Glutamate synthase genes of the diazotroph <i>Azospirillum brasilense</i> . Cloning, sequencing, and analysis of functional domains," <i>J. Biol. Chem.</i> 268:3099 (1993).	
		PEREZ-AMADOR, et al., "Expression of arginine decarboxylase is induced during early fruit development and in young tissues of <i>Pisum sativum</i> (L)," <i>Plant Mol. Biol.</i> 28:997 (1995).	
		PERLAK, et al., "Modification of the coding sequence enhances plant expression of insect control protein genes," <i>Proc. Natl. Acad. Sci. USA</i> 88: 3324 (1991).	
		PETIT, et al., "PcrA is an essential DNA helicase of <i>Bacillus subtilis</i> fulfilling functions both in repair and rolling-circle replication," <i>Mol. Microbiol.</i> 29:261 (1998).	
		POIRIER et al., "Polyhydroxybutyrate, a Biodegradable Thermoplastic Produced in Transgenic Plants," <i>Science</i> 256:520-523 (1992).	
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		REDENBACH, et al., "A set of ordered cosmids and a detailed genetic and physical map for the 8 Mb <i>Streptomyces coelicolor</i> A3(2) chromosome," <i>Mol. Microbiol.</i> 21:77 (1996).	
		REITZER, "Ammonia Assimilation and the Biosynthesis of Glutamine, Glutamate, Aspartate, Asparagine, L-Alanine, and D-Alanine," in <i>Escherichia coli and Salmonella</i> , (Neidhardt, ed.), pp. 391-407, ASM Press: Washington, D.C., 1996.	

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				First Named Inventor		Gjalt W. Hulsman	
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		SAITO & DOI, "Microbial synthesis and properties of poly(3-hydroxybutyrate-co-4-hydroxybutyrate) in Comamonas acidovorans," <i>Int. J. Biol. Macromol.</i> 16:18 (1994).	
		SAITO, et al., "Microbial Synthesis and properties of Poly(3-hydroxybutyrate-co-4-hydroxybutyrate)," <i>Polym. Int.</i> 39:169 (1996).	
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		SMITH, et al., "Complete genome sequence of Methanobacterium thermoautotrophicum deltaH: functional analysis and comparative genomics," <i>J. Bacteriol.</i> 179:7135 (1997).	

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		SNEDECOR, et al., "Selection, expression, and nucleotide sequencing of the glutamate dehydrogenase gene of <i>Peptostreptococcus asaccharolyticus</i> ," <i>J. Bacteriol.</i> 173:6162-6167 (1991).	
		SÖHLING & GOTTSCHALK, "Molecular analysis of the anaerobic succinate degradation pathway in <i>Clostridium kluyveri</i> ," <i>J. Bacteriol.</i> 178:871-880 (1996).	
		SÖHLING & GOTTSCHALK, "Purification and characterization of a coenzyme-A-dependent succinate-semialdehyde dehydrogenase from <i>Clostridium kluyveri</i> ," <i>Eur. J. Biochem.</i> 212: 121-127 (1993).	
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		STIM & BENNETT, "Nucleotide sequence of the <i>adi</i> gene, which encodes the biodegradative acid-induced arginine decarboxylase of <i>Escherichia coli</i> ," <i>J. Bacteriol.</i> 175:1221 (1993).	
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		SZUMANSKI & BOYLE, "Analysis and sequence of the speB gene encoding agmatine ureohydrolase, a putrescine biosynthetic enzyme in Escherichia coli," <i>J. Bacteriol.</i> 172:538, (1990).	
		TELLER, et al., "The glutamate dehydrogenase gene of Clostridium symbiosum. Cloning by polymerase chain reaction, sequence analysis and over-expression in Escherichia coli," <i>Eur. J. Biochem.</i> 206:151-159 (1992).	
		THAKUR, et al., "Changes in the Electroencephalographic and γ-Aminobutyric Acid Transaminase and Succinic Semialdehyde Dehydrogenase in the Allergen Induced Rat Brain," <i>Biochem. Int.</i> 16:235-243 (1998).	
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		TZIMAGIORGIS, et al., "Structure and expression analysis of a member of the human glutamate dehydrogenase (GLUD) gene family mapped to chromosome 10p11.2," <i>Hum. Genet.</i> 91:433-438 (1993).	
		VALENTIN, et al., "Identification of 4-hydroxyhexanoic acid as a new constituent of biosynthetic polyhydroxyalkanoic acids from bacteria," <i>Appl. Microbiol. Biotechnol.</i> 40:710-16 (1994).	
		VALENTIN, et al., "Identification of 4-hydroxyvaleric acid as a constituent of biosynthetic polyhydroxyalkanoic acids from bacteria," <i>Appl. Microbiol. Biotechnol.</i> 36:507-14 (1992).	
		VALENTIN, et al., "Identification of 5-hydroxyhexanoic acid, 4-hydroxyheptanoic acid and 4-hydroxyoctanoic acid as new constituents of bacterial polyhydroxyalkanoic acids," <i>Appl. Microbiol. Biotechnol.</i> 46:261-67 (1996).	
		VALENTIN, et al., "Production of poly(3-hydroxybutyrate-co-4-hydroxybutyrate) in recombinant Escherichia coli grown on glucose," <i>J. Biotechnol.</i> 58: 33-38 (1997).	

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		VALLE, et al., "Complete nucleotide sequence of the glutamate dehydrogenase gene from Escherichia coli K-12," <i>Gene</i> 27:193-199 (1984).	
		VALLE, et al., "Nucleotide sequence of the promoter and amino-terminal coding region of the glutamate dehydrogenase structural gene of Escherichia coli," <i>Gene</i> 23: 199-209 (1983).	
		WANG, et al., "In vivo cloning of proline genes and its expression in Escherichia coli," <i>Chin. J. Biotechnol.</i> 6:27 (1990).	
		WATSON, et al., "Isolation and Characterization of a Second Arginine Decarboxylase cDNA from Arabidopsis (Accession No. AF009647)," <i>Plant Physiol.</i> 114:1569 (1997).	
		WILLADSEN & BUCKEL, "Assay of 4-hydroxybutyryl-CoA dehydratase from <i>Clostridium aminobutyricum</i> ," <i>FEMS Microbiol. Lett.</i> 70:187-192 (1990).	
		WILLIAMS, et al., "Biodegradable plastics from plants," <i>CHEMTECH</i> 26:38-44 (1996).	
		WOLFF, et al., "Dehydrogenases involved in the conversion of succinate to 4-hydroxybutanoate by <i>Clostridium kluyveri</i> ," <i>Appl. Environ. Microbiol.</i> 59:1876-1882 (1993).	
		YEE, et al., "Isolation and characterization of a NADP-dependent glutamate dehydrogenase gene from the primitive eucaryote <i>Giardia lamblia</i> ," <i>J. Biol. Chem.</i> 267:7539-7544 (1992).	

Examiner's Signature	Date Considered
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